CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

J0114

Project Title

Tabletop Hurricanes: A Study of Vortex Stability in a Rotating Fluid

Abstract

Objectives/Goals

The objective of this experiment was to determine which factor most impacts the stability of a vortex in a rotating fluid.

Methods/Materials

Multi-speed turntable, basin, water, food coloring, stopwatch. Measured the amount of time a stable vortex lasted when subjected to different factors (High and low heat, low rotational speed, and a physical disturbance).

Results

Vortices were subjected to the different factors, with 3 trials per factor. The control vortices lasted an average of 40 minutes, the low heat vortices 61 minutes, the high heat 6 minutes, the low rotational speed 35 minutes, and the physical disturbance 31 minutes.

Conclusions/Discussion

Vortices were subjected to different factors multiple times, which revealed that the factor with the greatest impact is the heat of the fluid surrounding the vortex, not the physical disturbance as hypothesized. Thus, the most plausible cause for a considerable change in the stability of a vortex is a change in temperature.

Summary Statement

I found that the temperature of the fluid surrounding a vortex is the factor that most impacts the stability of a vortex.

Help Received

A demonstration performed by Dr. Johnathon Aurnou from UCLA's SPINLab inspired me to conduct this experiment.